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1762

Docket No.: GR 00 P 1583

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MAIL STOP: APPEAL BRIEF-PATENTS

By: Longheng Chen

Date: September 12, 2005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

Applic. No. : 09/817,963 Confirmation No.: 9891
Inventor : Klaus Lowack
Filed : March 27, 2001
Title : Method for the Metalization of an
Insulator and/or a Dielectric
TC/A.U. : 1762
Examiner : Brian K. Talbot
Customer No. : 24131

Hon. Commissioner for Patents
Alexandria, VA 22313-1450

BRIEF ON APPEAL

S i r :

This is an appeal from the final rejection in the Office action dated January 13, 2005, finally rejecting claims 4-7.

Appellants submit this *Brief on Appeal* in triplicate, including payment in the amount of \$500.00 to cover the fee for filing the *Brief on Appeal*.

09/16/2005 EFLORES 00000035 09817963

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Real Party in Interest:

This application is assigned to Infineon Technologies AG of München, Germany. The assignment will be submitted for recordation upon the termination of this appeal.

Related Appeals and Interferences:

No related appeals or interference proceedings are currently pending which would directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

Status of Claims:

Claims 4-7 are rejected and are under appeal. Claims 1-3 were cancelled in a preliminary amendment dated June 19, 2001.

Status of Amendments:

No claims were amended after the final Office action. A *Response under 37 CFR § 1.116* was filed on June 6, 2005. The Primary Examiner stated in an *Advisory Action* dated June 16, 2005, that the request for reconsideration had been considered but did not place the application in condition for allowance.

Summary of the Claimed Subject Matter:

The invention of the instant application relates to a process for metallizing at least one insulating layer of an electronic or microelectronic component. The method includes the following

steps: applying at least one first insulating layer to a substrate such that the first insulating layer has a thickness not greater than 50 m (see page 3, lines 20-23 of the specification); activating the entire first insulating layer by treatment with an activator, the activator being at least one of a gas, a liquid, a solution, and a plasma (see page 3, line 24 and page 7, lines 22-23 of the specification); then, after activating the entire first insulating layer, applying and patterning a second insulating layer made of a photosensitive material (see page 7, lines 10-13 and page 6, line 20 of the specification); and then, after applying and patterning the second insulating layer, seeding and metallizing regions of the first insulating layer that are exposed by the patterning step (see page 4, lines 14-15 of the specification).

Optionally, the first insulating layer is patterned before the first layer is activated and second insulating layer is applied (see page 7, lines 15-16 of the specification).

References Cited:

5,021,129	Arbach, et al.	June 4, 1991
US 6,212,769 B1	Boyko, et al.	April 10, 2001
4,448,804	Amelio, et al.	May 15, 1984
5,800,858	Bickford, et al.	September 1, 1998

Grounds of Rejection to be Reviewed on Appeal

1. Whether or not claims 4-7 are obvious over Arbach, et al. in combination with Boyko, et al. or Amelio, et al. and further in combination with Bickford, et al. under 35 U.S.C. §103.

Argument:

Whether or not claims 4-7 are obvious over Arbach, et al. in combination with Boyko, et al. or Amelio, et al. and further in combination with Bickford, et al. under 35 U.S.C. §103.

In item 3 on pages 2-3 of the above-identified Office Action, claims 4-7 have been rejected as being unpatentable over Arbach et al. in combination with Boyko et al. or Amelio et al. or vice versa, and further in combination with Bickford et al. under 35 U.S.C. § 103(a).

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful. Claim 4 calls for, *inter alia*, a process for metallizing at least one insulating layer of an electronic or microelectronic component, by:

activating the entire first insulating layer by treatment with an activator, the activator being at least one of a gas, a liquid, a solution, and a plasma;

then, after activating the entire first insulating layer, applying and patterning a second insulating layer made of a photosensitive material; and

then, after applying and patterning the second insulating layer, seeding and metallizing regions of the first insulating layer that are exposed by the patterning step.
(Emphasis added)

An important aspect of the invention of the instant application is that an activation of the first layer retains its effects with regard to the seeding, even when the activated first layer is covered with a second layer before it is seeded, which second layer is subsequently structured so that partial regions of the activated first layer are exposed, as recited in claim 4 of the instant application.

The Examiner has stated that Arbach et al. teach applying a first electroactive layer and then a second electroactive layer. Subsequently, the second electroactive layer is structured in order to form exposed regions. The exposed regions of the first layer are then activated by seeding and subsequently metallized in order to form conductive traces.

However, Arbach et al. do not disclose a photolithographic method, and do not disclose or suggest "applying and patterning a second insulation layer made of a photosensitive material" as recited in claim 4 of the instant application. Nor do Arbach et al. disclose activating the entire first insulating layer by treatment with an activator prior to applying the second layer as set forth in independent claim 4

of the instant application and acknowledged by the Examiner. Arbach et al. are completely silent with regard to providing process steps according to the claimed invention of the instant application. Because of the basic deficiencies of Arbach et al., the Examiner finds it necessary to form a mosaic of references in an unsuccessful attempt to show the claimed invention of the instant application.

Arbach et al. use only materials for the two layers which have a different redox potential, since only one activation method is disclosed. Activation is accomplished by using electrons, which are provided with a potential selected such that it can be assured that there is sufficient potential so that the exposed regions can be activated. Activation is not achieved by treating the first layer with an "activator being at least one of a gas, a liquid, a solution, and a plasma" as recited in claim 4 of the instant application.

Furthermore, in Arbach et al. the seeding is performed immediately after the activation. This means that, between the activation of the exposed first layer and the seeding of the activated partial region, no further layer (or "second insulating layer" as recited in claim 4 of the instant application) is formed on the activated region of the first layer.

This is in contrast to the object of the invention of the instant application to provide a flexible method for applying a metal layer onto an insulating layer without requiring additional seeding agent.

The invention of the instant application achieves this object by providing the entire first layer being activated prior to the application of the second insulating layer, and then the second layer being applied, as recited in independent claim 4 of the instant application. Since the activation of the first layer is performed prior to the application of the second layer, which is possible because activation is by fluids, solution, plasma, or a gas (as recited in claim 4 of the instant application), it is not necessary to form the second insulating layer from a different material than the first insulating layer. The subsequent seeding only takes place on the exposed regions of the activated first insulating layer so that no unnecessary or additional seeding agent is used.

As previously stated, an important feature of the invention of the instant application is that an activation of the first layer maintains its effects regarding the seeding, even if the activated first layer is covered with a second layer prior to seeding, which second layer is subsequently structured in

order to expose partial regions of the activated first layer. Thus, the method according to the claimed invention of the instant application is much more flexible with regard to material selection without requiring more seeding agent.

Arbach et al. discloses forming a first electroactive layer and then a second electroactive layer. Subsequently, the second electroactive layer is structured to form uncovered (exposed) regions. These exposed regions are activated by seeding and then metallized to form conductor lines. According to Arbach et al., the materials used for the two layers must have a different redox potential, because only one activation method is disclosed and activation is achieved by using electrons having a potential selected such that, by using the potential, only the exposed regions can be activated, not the entire first insulating layer as claimed in claim 4 of the instant application. This kind of activation shows the disadvantage, for example, that a voltage source and a cabling must be provided, which is eliminated by the method according to the claimed invention of the instant application. Thus, the process according to the claimed invention of the instant application is significantly simpler than the method disclosed in the prior art as typified by Arbach et al., in particular by eliminating cabling.

Further, it is submitted that a person skilled in the art having Arbach et al. before him or her, would not necessarily look to Boyko et al. or Amelio et al. to make up for the deficiencies of Arbach et al., or to arbitrarily add features as suggested by the Examiner.

In Boyko et al. and Amelio et al., the entire surface of a first layer is roughened, however, in both references, the entire surface, which includes even those regions on which there are no metallizations, i.e., no conductor tracks are formed, is subsequently seeded. Thus, the quantity of the required seeding agent is significantly increased. It is not technically practical or feasible to "reduce the amount of seeding" or "improve adherence of the deposited seed" as alleged by the Examiner (see page 3, lines 1-8 of the final Office action dated January 13, 2005) as the basis for combining the secondary references with Arbach et al. Exactly the opposite of what the Examiner hopes to accomplish would occur, because such a combination of references would actually increase the quantity of the seeding agent. According to Arbach et al., only the exposed regions of the first layer are activated and seeded after the structuring of the second layer, so that the required seeding agent used in Arbach et al. is less than that used in Boyko et al. or Amelio et al.

Bickford et al. do not overcome the deficiencies of Arbach et al. or any combination of Arbach et al. with Boyko et al. or Amelio et al., notwithstanding that such a combination is improper. Bickford et al. do not show the sequence of steps recited in independent claim 4 of the instant application as previously discussed. Nor is the claimed invention of the instant application disclosed or suggested by a combination of Arbach et al. and Boyko et al. or Amelio et al., and Bickford et al.

Appellants submit that the only basis for even combining the references as proposed by the Examiner is hindsight reconstruction of the prior art after having read Appellants' disclosure and that the Examiner has not relied on only "knowledge which was within the level of ordinary skill at the time the claimed invention was made." On the contrary, the Examiner has dissected the claims and recognized that that the primary reference of Arbach et al. is substantially deficient with respect to the claimed features of the instant application and then arbitrarily selected features from the prior art to make up for those deficiencies. Appellants submit that the Examiner's suggested combination of references is nothing more than a futile attempt to show the present claimed invention of the instant application by a mosaic of individual isolated features from different references. The

Examiner's proposed combination of references is considered improper, notwithstanding the Examiner's statements in the above-identified Office Action.

A critical step in analyzing the patentability of claims pursuant to 35 U.S.C. § 103 is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. See In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614,1617 (Fed. Cir. 1999). Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one "to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher." Id. (quoting W.L. Gore & Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 313 (Fed. Cir. 1983)).

Most if not all inventions arise from a combination of old elements. See In re Rouffet, 149 F.3d 1350, 1357, 47 USPQ2d 1453,1457 (Fed. Cir. 1998). Thus, every element of a claimed invention may often be found in the prior art. See id. However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. See id. Rather, to establish

obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion, or teaching of the desirability of making the specific combination that was made by the appellant. See In re Dance, 160 F.3d 1339, 1343, 48 USPQ2d 163.5, 1637 (Fed. Cir. 1998); In re Gordon, 733 F.2d 900, 902, 221 USPQ 1125,1127 (Fed. Cir. 1984).

The motivation, suggestion, or teaching may come explicitly from statements in the prior art, the knowledge of one of ordinary skill in the art, or, in some cases the nature of the problem to be solved. See Dembiczak, 175 F.3d at 999, 50 USPQ2d at 1617. In addition, the teaching, motivation, or suggestion may be implicit from the prior art as a whole, rather than expressly stated in the references. See WMS Gaming, Inc. v. International Game Tech., 184 F.3d 1339, 1355, 51 USPQ2d 1385, 1397 (Fed. Cir. 1999). The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. See In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981) (and cases cited therein). Whether the examiner relies on an express or an implicit showing, the examiner must provide particular findings related thereto. See Dembiczak, 175 F.3d at 999, 50 USPQ2d at 1617.

Broad conclusory statements standing alone are not "evidence."

Id. When an examiner relies on general knowledge to negate patentability, that knowledge must be articulated and placed on the record. See In re Lee, 277 F-3d 1338, 1342-45, 61 USPQ2d 1430, 1433-35 (Fed. Cir. 2002).

Upon evaluation of the Examiner's comments, it is respectfully believed that in this instance the evidence adduced by the Examiner is insufficient to establish a prima facie case of obviousness with respect to the claims.

The references do not show "activating the entire first insulating layer by treatment with an activator, the activator being at least one of a gas, a liquid, a solution, and a plasma; then, after activating the entire first insulating layer, applying and patterning a second insulating layer made of a photosensitive material; and then, after applying and patterning the second insulating layer, seeding and metallizing regions of the first insulating layer that are exposed by the patterning step" as recited in claim 4 of the instant application.

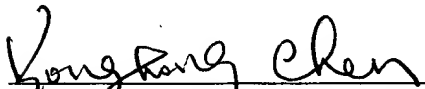
Nor do the references show the feature of "patterning the first insulating layer before the entire first layer is activated and

before the second insulating layer is applied" as recited in dependent claims 6 and 7 of the instant application.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claim 4 of the instant application. Claim 4 is, therefore, believed to be patentable over the art. The dependent claims are believed to be patentable as well because they all are ultimately dependent on claim 4 and further because claims 6 and 7 per se recite limitations that are not shown in the prior art.

In view of the foregoing, the honorable Board is therefore respectfully urged to reverse the final rejection of the Primary Examiner.

Respectfully submitted,



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Claims Appendix:

1. A process for metallizing at least one insulating layer of an electronic or microelectronic component, which comprises:

applying at least one first insulating layer to a substrate such that the first insulating layer has a thickness not greater than 50 m;

activating the entire first insulating layer by treatment with an activator, the activator being at least one of a gas, a liquid, a solution, and a plasma;

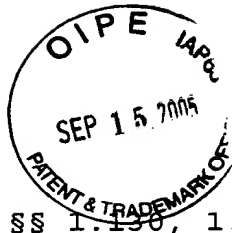
then, after activating the entire first insulating layer, applying and patterning a second insulating layer made of a photosensitive material; and

then, after applying and patterning the second insulating layer, seeding and metallizing regions of the first insulating layer that are exposed by the patterning step.

5. The process according to claim 4, which comprises forming the first insulating layer and the second insulating layer from the same material.

6. The process according to claim 5, which comprises patterning the first insulating layer before the entire first layer is activated and before the second insulating layer is applied.

7. The process according to claim 4, which comprises patterning the first insulating layer before the entire first layer is activated and before the second insulating layer is applied.



Evidence Appendix:

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or any other evidence has been entered by the Examiner and relied upon by appellant in the appeal.



Related Proceedings Appendix:

Since there are no prior or pending appeals, interferences or judicial proceedings which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in this appeal, no copies of decision rendered by a court or the Board are available.